

UNITED STATES MARINE CORPS
Logistics Operations School
Marine Corps Combat Service Support Schools
Training Command
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LVSM 7106

STUDENT OUTLINE

OPERATE THE MK18

LEARNING OBJECTIVES

1. Terminal Learning Objective: Given an MK48/18, TM 2320-10/11A, and TM 09470B-10/1, operate the MK18 in the container and bridge modes in conjunction with maintenance related operational check, per the references. (3521.13.25)
2. Enabling Learning Objectives:
 - a. Given an MK48/18, TM 2320-10/11A Supplement 1, prepare the MK48/18 for operation, per the references. (3521.13.25a)
 - b. Given an MK48/18, TM 2320-10/11A Supplement 1, operate the MK18 components, using the remote control unit, per the references. (3521.13.25b)
 - c. Given an MK48/18, TM 2320-10/11A Supplement 1, operate the MK18 components, using the manual controls unit, per the references. (3521.13.25c)

OUTLINE

1. INTRODUCTION TO THE MK18

- a. The MK18 rear body unit (RBU), operating with the MK48 front power unit, forms the fifth tactical system in the Logistics Vehicle System (LVS) series. The MK48/18 is designed to self-load, transport, and self-unload standardized containers and ribbon bridge systems. Additionally, the MK18 can be used to self-load and self-unload a bridge erection boat and boat cradle assembly and it can be used for high bank operation of ribbon bridges.
- b. The MK18 lift system is capable of lifting 45,000 pounds. However, the maximum payload weight for the MK18 is 40,000 pounds. It is designed to lift ISO/ANSI containers or, with the help of the winch system, a ribbon

bridge section or bridge erection boat and boat cradle assembly. The MK18 lift system consists of the following components.

(1) Two tilt cylinders which tilt the rear mast and inner mast assemblies from a horizontal to a vertical position.

(2) A main cylinder which extends and retracts the inner mast.

(3) A sliding beam assembly which rides on the inner mast.

(a) The sliding beam travels fore and aft on the inner mast, at twice the rate of the inner mast, whenever the main cylinder is retracted or extended. The sliding beam assembly is used to load and unload ISO/ANSI containers.

(b) Inside the sliding beam are two cylinders which are attached to chains. The chains have twist lock assemblies on the opposite ends and attach to the front corners of an ISO/ANSI container.

(c) The sliding beam cylinders are extended and retracted to maneuver the ISO/ANSI containers during loading and unloading operations.

(4) A roller jack assembly which is lowered to give stability to the MK18 during ISO/ANSI container loading and unloading operations on hard surfaces.

(5) ISO/ANSI container rollers and guides that maintain proper alignment of containers during loading and unloading operations.

(6) Conveyor assemblies on each side of the MK18, at the rear, consisting of links riding on rollers, the function of which is to reduce the friction between the unit and the MK18 as the unit moves. Units being loaded and unloaded onto or from the MK18 initially ride on the conveyor assemblies.

(7) Rear twist lock assemblies which secure the rear of the ISO/ANSI container to the MK18.

c. The MK18 winch system is used to load and unload ribbon bridge sections and the ribbon bridge erection boat and boat cradle assembly.

d. All MK18 lifting assemblies and the winch system are powered by hydraulic fluid supplied to the MK18 by the MK48 and filtered by an in-line filter on the MK18 that removes all particles larger than ten microns.

e. In normal operation, the MK18 lifting components and winch system are controlled through the remote control unit, which receives electrical power from the MK48 through an electrical harness.

f. There are three personnel and equipment safety features incorporated into the MK18 electrical system.

(1) The first such feature is an emergency stop switch located on the remote control unit (RCU). When this switch is pressed, an electrically controlled valve is closed and all hydraulic fluid delivered from the MK48 is bypassed before it reaches the lifting components and hydraulic operations are stopped. When the emergency stop switch is reset, normal hydraulic operations are restored.

(2) The second feature is two tilt-over-center limit switches that are attached to the ISO/ANSI container rear pivots. These switches prevent the inner mast assembly from pivoting more than 90 degrees from horizontal during container loading and unloading operations only. During bridge/boat operations, the mast will tilt to approximately 107 degrees. This is due to changing the pivot points and has nothing to do with the tilt over center switches.

(3) The third safety feature is a cable tension limit switch mounted on the cable tensioner assembly which prevents the winch from unwinding when there is no tension on the winch cable.

2. IDENTIFICATION, LOCATION, AND FUNCTION OF MANUAL/REMOTE CONTROLS

a. Manual Control Panel. The controls on this panel are used to manually operate the MK18 during pre-operation and in the event of a RCU malfunction. If an RCU malfunctions, obtain a known good RCU to continue. If a known good RCU cannot be obtained, utilize manual operation and/or troubleshoot the malfunction in strict accordance with TM 2320-20/12A Supplement-1. The panel consists of seven control levers.

(1) The ROLLER JACK UP/DOWN lever which raises or lowers the roller jack assembly.

(2) A SLIDE LOAD/UNLOAD control lever to extend or retract the main cylinder and move the sliding beam assembly.

(3) A LH CHAIN IN/OUT control which extends or retracts the left front twist lock chain on the sliding beam assembly.

(4) A RH CHAIN IN/OUT control lever that extends or retracts the right front twist lock chain on the sliding beam assembly.

(5) The TILT DOWN/UP control to lower or raise the mast assembly.

(6) A WINCH WIND IN/WIND OUT control that rewinds or pays out the winch cable and hook. The winch cable will not pay out when there is no tension on the cable or when the cable tension limit switch has not been activated.

(7) The last one is the BRIDGELOCK LOCK/UNLOCK control which extends or retracts the front locking assembly cylinder.

b. Remote Control Unit. The RCU allows remote operations for ISO/ANSI containers, bridge bay/ramp bay, bridge erection boat, and boat cradle loading and unloading operations. The RCU contains an assortment of controls and indicators.

(1) A CONTAINER MODE switch which is a green push-button that selects container mode operations. When this push-button is pressed, winch and bridge lock functions are nonfunctional.

(2) A green indicator lamp that lights to indicate that the container mode has been selected.

(3) A BRIDGE/BOAT MODE switch which is a yellow push-button that selects bridge/boat mode of operation. When this push-button is pressed, the slide, chains, and roller jack are nonfunctional.

(4) A yellow indicator lamp that lights to indicate that the bridge/boat mode has been selected.

(5) A left joystick that controls the left chain and the slide when in the container mode and the winch control when in the bridge/boat mode.

(6) A right joystick that controls the right chain when in the container mode and the mast tilt for both modes. A speed control push-button is located on top of the joystick. Pressing the speed control increases the speed of all functions. The fast speed is never used for loading and unloading. It is used only during pre-operations and post operations.

(7) DUAL-PURPOSE switches. Like the joysticks, two switches on the RCU control more than one function. They control one function if the RCU is operating in the container mode and an entirely different function when operating in the bridge/boat mode. These two switches are the ROLLER JACK UP/BRIDGELOCK LOCK and ROLLER JACK DOWN/BRIDGELOCK UNLOCK switches.

(a) A ROLLER JACK UP and BRIDGELock switch which is a black push-button. This switch raises the roller jack when in the container mode and locks the bridge lock when in the bridge/boat mode.

(b) A ROLLER JACK DOWN and BRIDGELock UNLOCK switch which is a white push button. It lowers the roller jack when in the container mode and unlocks the bridge lock when in the bridge/boat mode.

(8) An EMERGENCY STOP switch which is a red push-button. When the button is in the up position, it enables MK18 hydraulics to allow for remote control operations. When the push-button is pressed, the switch remains in the down position and disables the MK18 hydraulics, preventing remote control operations.

(9) A red indicator lamp which lights to indicate that electrical power is applied to the RCU and a mode of operation has not been selected. The lamp goes off when a mode of operation has been selected.

3. PREPARE THE MK48/18 FOR OPERATION

a. Start the Vehicle

- (1) Apply the parking brake by pulling the parking brake valve out.
- (2) Place the transmission shifter in the neutral (N) position.
- (3) Turn the engine start switch to the START position and release it when the engine starts, allowing the switch to return to the ON position.
- (4) Observe the dashboard indicators and gages (air, oil, water, and battery) for proper operation.
- (5) Pull the selector valve out to the AUXILIARY HYDRAULICS position.

b. Prepare the RCU

- (1) Open the door of the storage box and remove the RCU and its cable. Close the storage box door.
- (2) Press the EMERGENCY STOP push-button switch on the RCU.
- (3) Connect the RCU cable to plug (P2) on the side of the storage box.
- (4) Connect the RCU cable to the bottom of the RCU.

(5) Check to ensure all indicator lamps on the RCU are off.

(6) Place the belt from the RCU around your waist, hook the buckle, and adjust it as necessary.

(7) Rotate the EMERGENCY STOP push-button switch on the RCU to the RESET (clockwise) position.

(a) The red EMERGENCY STOP indicator lamp is on.

(b) The green CONTAINER MODE indicator lamp flashes on and off.

(c) The yellow BRIDGE/BOAT MODE indicator lamp flashes on and off.

c. Manual Control Operations

(1) Operations are normally conducted using the RCU but, if the operation of the MK18 were to be in the manual condition, you would move to the manual control panel and begin operations.

4. OPERATE THE MK18, USING THE REMOTE CONTROL UNIT (RCU), IN THE CONTAINER AND BRIDGE/BOAT MODES

a. Container Mode Operation. When performing MK48/18 operations in the container mode, specific steps must be followed for safe operation.

(1) Position the pivot lock pins in the rear pivot pin holes on the pivot assembly. The pivot lock pins must be positioned for ISO/ANSI container mode on both sides of the MK18. The incorrect positioning of these lock pins will cause damage to the vehicle.

(2) Press and hold the green (CONTAINER MODE) push button switch and observe the following:

(a) The green (CONTAINER MODE) indicator lamp comes on and remains on.

(b) The yellow (BRIDGE/BOAT MODE) indicator lamp is off.

(c) The red (EMERGENCY STOP) indicator lamp is off.

(3) Now lower the roller jack assembly by pressing the ROLLER JACK DOWN (white) push button. Ensure that the roller jack has completely lowered.

(4) Raise the roller jack assembly by pressing the ROLLER JACK UP (black) push button. Ensure that the roller jack raises and is stowed in its upward position.

(5) Next, we want to raise (or tilt) the mast assembly. To do so, grasp the right joystick, move it to the TILT UP position and hold it there until the lift mast assembly is vertical. Release (return) the joystick to its neutral position. The right joystick contains a speed push button switch for fast speed (engine high idle). This fast speed should be used only for pre/post operational checks and should never be used for loading/unloading operations.

(6) Lower the mast assembly by moving and holding the right joystick to the TILT DOWN position. Make sure the mast assembly is fully lowered. Release (return) the joystick to its neutral position.

(7) Extending the left and right twist locks and chains is accomplished by performing some steps in the same manner and some steps simultaneously.

(a) Disconnect the left and right twist locks from their brackets on the sliding beam.

(b) Position the left and right chains into their chain supports.

(c) Simultaneously, grasp and hold the left and right joysticks to the left and right CHAIN OUT positions.

(d) Observe the chains moving out of the sliding beam chain tubes.

(e) Release (return) the joysticks to their neutral positions.

(8) Retracting the left and right twist locks and chains is accomplished by performing steps similar to extending them.

(a) Simultaneously, grasp and hold the left and right joysticks to the left and right CHAIN IN positions.

(b) Observe the chains retracting.

(c) After both twist locks and chains are fully retracted, extend both approximately 1 inch.

(d) Release (return) the joysticks to their neutral positions.

(e) Stow both left and right twist locks in their brackets on the sliding beam assembly.

(9) To slide the sliding beam assembly forward, grasp and hold the left joystick to the SLIDE LOAD position, observe the movement of the sliding beam until it moves to its most forward position, then release (return) the joystick to its neutral position.

(10) To return the sliding beam assembly to its stowed position, grasp and hold the left joystick to the SLIDE UNLOAD position, observe the sliding beam until it moves to its most rearward or stowed position, then release (return) the joystick to its neutral position.

b. Bridge/Boat Mode Operation. Before operation of the MK18 in the bridge/boat mode, the vehicle must be configured for that operation. The steps required to configure and check for proper operation in the bridge/boat mode are the same as for the container mode with a few exceptions.

(1) The pivot lock pins are positioned in the forward, vice the rear, pivot pin holes on the pivot assembly. The pivot lock pins must be positioned in this location on both sides of the MK18 while the vehicle is in the bridge/boat mode. Incorrect positioning of these lock pins will cause damage to the equipment.

(2) Install the front locking assembly.

(a) Position the sliding beam fully forward on the mast assembly.

(b) Remove the front locking assembly from stowage in the right front inner frame.

(c) Position and secure the front locking assembly on the sliding beam assembly.

(d) Connect the hydraulic lines to the front locking assembly.

1 Ensure the MK48 engine is shut off.

2 Remove the two hydraulic hoses from the tool box and remove the dust caps.

3 Connect the hydraulic hoses to the quick-disconnects on the left cylinder on the mast assembly and the quick-disconnects on the locking cylinder on the locking assembly.

(e) Loosen the handle on the front locking assembly and rotate the locking cylinder fully downward then tighten the handle.

(f) Check the locking assembly for operation.

1 Start the MK48 engine.

2 Select the bridge/boat mode on the RCU for bridge/boat operations.

3 Push the bridgelock (black) push-button switch and observe if the lock cylinder locks.

4 Push the bridgelock unlock (white) push-button switch and observe if the lock cylinder unlocks.

(3) Raise the lift mast assembly until the bottom of the sliding beam assembly is approximately 4 feet above the chassis.

(4) Operate the winch. Only those steps required to check the winch for proper operation will be covered during this class, as we have no boat to actually load or unload.

(a) Two personnel are required to unwind the winch cable; one to operate the winch controls and a second to apply tension to the cable or push down on the cable tension switch to activate it so the winch will operate.

(b) Do not handle the winch cable with your bare hands. A broken or frayed cable can cause personal injury. Always wear heavy leather gloves when handling cable and do not allow the cable to slide through your hands.

(c) One person should push down (activate the cable tension switch while grasping the cable behind the roller assembly as the other person moves the joystick to the WINCH OUT position on the RCU. The winch cable should pay out.

(d) The winch cable tension limit switch works only when unwinding or paying out the winch cable. To wind the cable in, just move the joystick to the WINCH IN position on the RCU. Take up the slack in the cable then release the joystick.

(e) By completing these steps, you have determined that the winch assembly is working properly.

5. OPERATE THE MK18, USING MANUAL CONTROLS, IN THE CONTAINER AND BRIDGE/BOAT MODES

a. As we stated during the first part of the lesson, the manual controls are normally used only during pre-operations and in the event of an RCU malfunction. However, as mechanics, you will be required to operate the vehicle using the manual controls to determine if the controls are working properly and to conduct troubleshooting procedures.

b. Remember this! If the RCU is connected to the MK18, the EMERGENCY STOP push-button switch on the RCU must be in the up position to operate the manual controls. If the EMERGENCY STOP push-button switch is in the down position, all hydraulics to the MK18 are bypassed; therefore, the manual controls will not work.

c. A decal on the bed rail immediately above the control levers is clearly marked to identify each control lever and indicate the direction the lever must be moved to perform a desired function.

d. If you remember back to the RCU, the right joystick has a speed control push-button that increases the speed of all functions by increasing the MK48 engine speed. The manual controls do not have this speed increase but all the levers except the roller jack and cylinder lock levers control proportional valves. The farther the lever is moved, the farther the valve is opened; therefore, speed can be increased from barely moving to normal loading and unloading speed simply by moving the levers their full travel distance.

e. Prepare for Manual Control Operation

(1) Apply the parking brake by pulling the parking brake valve out.

(2) Place the transmission shifter in the neutral (N) position.

(3) Turn the engine start switch to the START position and release it when the engine starts, allowing the switch to return to the ON position.

(4) Observe the dashboard indicators and gages (air, oil, water, and battery) for proper operation.

(5) Pull the selector valve out to the AUXILIARY HYDRAULICS position.

(6) Move to the manual control panel and begin operations.

REFERENCES:

TM 2320-10/11 Sup 1

TM 2320-10/11A

LI 2320-12/9 Sup 1